DECISION-MAKERS'SESSION SUMMARY

Sustainable Transport: Is the Future Electric?

Thursday, 27 May 2010

Moderator: Nik Gowing (International journalist and broadcaster)

Panellists: Dominique Bussereau (Secretary of State for Transport, France), Geraldine Knatz (Executive Director, The Port of Los Angeles), Henry Li (Senior Director, BYD Company), Tetsuro Tomita (Executive Vice President, East Japan Railway Company), Oluf Ulseth (Senior Vice President European Affairs, Statkraft), Mitsuhiko Yamashita (Executive Vice President R&D, Nissan).

Debate centered around four questions, with the role of the public sector addressed throughout.

1. What future energy mix and what speed of transition?
2. What must be done for electricity to play a significant role in transport?
3. What are the basic infrastructure needs?
4. What future energy use in non-road transport?

The following views and insights emerged:

1. What future energy mix and what speed of transition?

In general, changing the energy mix takes time given that infrastructure is long-lived and massive investments are involved. Transitions take 15 to 20 years, which is longer than is usually assumed – implicitly or explicitly – in political debate. As a consequence, global reliance on fossil fuels is to stay at around 80% until 2030 or so. The energy mix varies strongly across countries. Reliance on nuclear power is likely to increase in many places, but there the horizon is 2040- 2050. In the longer run, solar energy and carbon capture and storage (CCS) hold strong promise but the potential of both remains highly uncertain.

In transport, electricity will have a role to play according to many experts, but opinions diverge on exactly how large its potential is. Some see a very broad scope, arguing that electricity is the way forward under greenhouse gas emission constraints even if electricity production releases carbon, simply because electric engines are more efficient than ICEs. This view was challenged on the grounds that the additional electricity produced for transport will come from carbon-intensive fuels, until the extra demand is large enough to justify investments in other sources and until this new power comes online.

The potential for electric vehicles differs among countries. New Zealand, for example, strives for 90% EVs in 2025, hoping that the market will be built through high oil prices. But in India, capacity constraints in electricity production prevent widespread use of electric vehicles

(extra capacity is allocated to household use first). And in China power production will rely on coal for the next 20 years at least. This limits the potential for electric vehicles in those (large) economies, at least if these vehicles are mainly seen as means to cut transport emissions of greenhouse gases.

2. What must be done for electricity to play a significant role in transport?

Purchase prices obviously matter, and they can come down appreciably through lower battery costs and through learning and scale effects in production. In addition, for electric vehicles to be attractive, quick charging mechanisms are needed (e.g. allowing overnight charging with standard electrical supply). Also, traditional fuel prices need to be high. Historically, prices have not been high enough to induce a shift towards EVs. Although hurdles remain, there are large market segments for which good electric technologies exist already. For example, about ¼ of cars in Japan are sold in cities and usually are driven less than 20km/day. Electric cars are well suited for this type of use. Public procurement and graduated ownership taxes can help diffusion.

The lithium supply and disposal problem is not perceived as a major issue. Batteries last a long time (about a decade), with a first life in transport and a second life in alternative applications where reduced performance is acceptable. At the end of the battery lifetime, there is ample recycling potential (with recycled lithium not necessarily more costly than newly produced lithium). Lithium reserves are sufficient for the next 50 years at least even if the market share of EV develops along the lines expected by the most optimistic producers.

3. What are the basic infrastructure needs?

The advantage of electricity as a transport energy is that the basic infrastructure for generation and distribution is in place. Public support for recharging options may be helpful (supply push), but the main issue is to develop the market for electric cars (demand pull).

Electrification of transport can help spur the development of renewable power markets. In the short run, renewables – particularly wind energy – can help decarbonize power production. The problem then is to store energy as it is produced at unpredictable times. Electric vehicle batteries can help here. A different problem is local resistance against the development of wind energy.

4. What future energy use in non-road transport?

Panellists saw a large potential for electrification in maritime and in rail transport. Green power and decarbonisation concerns in ports create a large potential for electricity usage. In the port of Los Angeles, solar is promising. The main problem is not production but transmission lines coming from the desert to the coast. In Los Angeles, the port actually has more leverage than regulators to make requests from large users. The port sets standards, e.g. on emissions from and power supply for ships, which may cost it some growth but is needed to comply with increasingly strict state requirements regarding environmental performance.

Fast trains are fairly energy-intensive. To reduce energy consumption, trains could reduce speed, use regenerative braking, or reduce weight. Newest generation Shinkansens are about 50% lighter than their predecessors, indicating there is technological potential to maintain service levels while cutting energy intensity. India is pursuing massive electrification of its rail system, at a rate of +2%-point per year. With the scarcity of overall electric power supply, this implies a further constraint on large scale electrification of road transport.

In sum, there is considerable scope for increasing the use of electricity as an energy source in transport. But whether electricity will replace fossil fuels as the main energy source in road transport is not at all obvious. While electric vehicles are competitive in some market segments, their overall potential is conditional on high fossil fuel prices, i.e. prices that are and remain beyond historical peaks.

The appeal of electric power in climate change terms depends strongly on how power is produced. In the short run, massive decarbonisation of power production should not be expected, although the use of wind power could be expanded. In the longer run, decarbonisation can be achieved through wider deployment of nuclear power. Solar energy and CCS remain a more distant and more uncertain perspective.